ConnectX® EN Dual Port Ethernet Network Interface Cards User's Manual

P/N: MNEH28-XSC, MNEH28-XTC, MNEH29-XSC, MNEH29-XTC

Rev 0.30

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ConnectX® EN Dual Port Ethernet Adapter Cards User's Manual

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Table of Contents

Revision History **6**

About this Manual **7**

Chapter 1 Overview **8**

1.1 Adapter Cards 8
1.2 Mellanox Part Numbering Legend 9
1.3 Finding the Mac Address and Serial Number on the Adapter Card 10

Chapter 2 Adapter Card Installation **11**

2.1 Hardware and Software Requirements 11
2.2 Installation Instructions 12

Chapter 3 Driver Software and Firmware **14**

3.1 Driver Software 14
3.2 Updating Adapter Card Firmware 14
3.3 Single Adapter Card Firmware Update 14

Chapter 4 Adapter Card Interfaces **15**

4.1 I/O Interfaces 15
4.2 I2C Compatible Interface 17
4.3 Power 17
4.4 Memory 17
4.5 VPDs 18

AppendixA Specifications **22**

A.1 Board Mechanical Drawing and Dimensions 22
A.2 EMC Certification Statements 22
A.3 MNEH28-[XTC, XSC] Specifications 25
A.4 MNEH29-[XTC, XSC] Specifications 26

AppendixB Interface Connectors Pinout **27**

B.1 I2C-compatible Connector Pinout 27
B.2 Ethernet Connector Pinout 27
B.3 PCI Express x8 Connector Pinout 28

AppendixC Replacing Existing Bracket on Adapter Cards **29**

C.1 Removing Bracket 29
C.2 Placing a Kapton® Polyimide Label 31
C.3 Assembling a New Bracket 33

AppendixD Avertissements de sécurité d'installation **37**

List of Tables

Table 1:	**Revision History Table**	**6**
Table 2:	**Documents List**	**7**
Table 3:	**Ethernet CX4 Network Interface Cards**	**8**
Table 4:	**Mellanox Adapter Cards Part Numbering Key**	**9**
Table 5:	**Hardware and Software Requirements**	**11**
Table 6:	**Jumper Configuration**	**17**
Table 7:	**VPD Layout for MNEH28-XTC**	**18**
Table 8:	**VPD Layout for MNEH28-XSC**	**19**
Table 9:	**VPD Layout for MNEH29-XTC**	**19**
Table 10:	**VPD Layout for MNEH29-XSC**	**21**
Table 11:	**Adapter Cards EMC certification Status**	**22**
Table 12:	**Specifications for MNEH28-[XTC XSC]**	**25**
Table 13:	**Specifications for MNEH29-[XTC XSC]**	**26**
Table 14:	**I2C-Compatible Connector Pinout**	**27**
Table 15:	**Connector Pin To Port Signal Name**	**28**

List of Figures

Figure 1: Port Numbering 15
Figure 2: Physical and Logical Link Indications 16
Figure 3: I2C Connector 17
Figure 4: Schematic of the Ethernet Adapter Card With CX4 Connectors 22
Figure 5: I2C-Compatible Connector 27
Figure 6: ConnectX CX4 Copper Connector Pinout 27
Figure 7: Tall Bracket of a Dual IB Port Adapter Card 29
Figure 8: Connector Retention Clip 29
Figure 9: Extracting Connector Clip 30
Figure 10: Unscrew Bracket Screws 30
Figure 11: Rotate the Bracket to Detach it From the Card 31
Figure 12: Hold Kapton Label With Pincers 31
Figure 13: Place Label on Print Side With Label's and Card's Holes Aligned 32
Figure 14: Ensure That Label is Well-attached 32
Figure 15: Adapter Card Ready for New Bracket 33
Figure 16: Place Bracket onto Card 33
Figure 17: Attach Bracket onto Card using Screws 34
Figure 18: Sliding Connector Clip Evenly 34
Figure 19: Fix Clip Hooks into Place Using Screwdriver 35
Figure 20: Spread the Hooks to Slide on the Clip 35
Figure 21: Assembled Bracket View 35
Figure 22: Print Side View After Bracket Assembly With Kapton Label 36

Revision History

This document was printed on 8/7/08.

Table 1 - Revision History Table

Date	Rev	Comments/Changes
May 2008	0.3	changes according to MRD Requested by Tar.
April 2008	0.20	Changed link to MLNX OFED page and removed Confidential in footer.
May 2007	0.10	Preliminary first revision
August 2008	1.0	Initial Release

About this Manual

This *User's Manual* describes Mellanox Technologies Ethernet PCI Express Network Interface Cards. It provides details as to the interfaces of the card, specifications, required software and firmware for operating the card, and relevant documentation.

Intended Audience

This manual is intended for the installer and user of these cards.

The manual assumes basic familiarity with Ethernet networks.

Related Documentation

Table 2 - Documents List

ConnectX®EN (MTNIC) PRM Document Number: DOC18348	Reference describing the interface used by developers to write a device driver.
ConnectX®EN Hardware Reference Manual Document Number: 2788HM	Reference for hardware engineers responsible for designing systems and boards.
Mellanox Firmware Tools (MFT) User's Manual Document Number: 2204UG	User's Manual describing the set of MFT firmware management tools. See http://www.mellanox.com under 'Firmware' downloads.
PCI Express 2.0 Specifications	Industry Standard PCI Express 2.0 Card Electromechanical Specification, Rev 1.3.
SFP+ Module Spec sheet Document Number: 2957	Reference for the Mellanox SFP + Module

Online Resources

- Mellanox Technologies Web pages: http://www.mellanox.com
- Mellanox Technologies Firmware download Web page: http://www.mellanox.com/ under Firmware downloads
- Mellanox Technologies Document Distribution System (DDS): http://docs.mellanox.com (requires a customer login account)

Document Conventions

When discussing memory sizes, MB and MBytes are used in this document to mean size in mega bytes. The use of Mb or Mbits (small b) indicates size in mega bits.

1 Overview

This document is a *User's Manual* for Mellanox Technologies Ethernet Network Interface Cards (NICs) based on the MT25408 ConnectX® EN integrated circuit device. The cards described in this manual have the following main features:

- IEEE 802.3ak compliant
- Two 10GBASE-CX4 copper ports for connecting Ethernet traffic
- PCI Express 2.0 (1.1 compatible) through an x8 edge connector up to 5GT/s
- 'Media detect circuit' with powered connectors supporting the use of active cables and external PHY fiber solutions
- EU Restriction of Hazardous Substances (RoHS) compliant

The cards differ in:

- Bracket height: short or tall
- PCI Express 2.0 with SerDes speed: 2.5 GT/s or 5.0 GT/s

1.1 Adapter Cards

Table 3 on page 8 lists the Ethernet NICs described in this manual.

Table 3 - Ethernet CX4 Network Interface Cards

Ordering Part Number (OPN)	PCI Express SERDES Speed	Data Transmission Rate	Short / Tall Bracket	RoHS Compliance	Adapter IC Part Number	NIC Photo (1)
MNEH28-XSC	2.5 GT/s PCIe Gen1	20 + 20 Gb/s	Short	RoHS-R5 (with exemption)	MT25408A0-FCC-SE	
MNEH28-XTC	2.5 GT/s PCIe Gen1		Tall			
MNEH29-XSC	5.0 GT/s PCIe Gen2	40 + 40 Gb/s	Short	RoHS-R5 (with exemption)	MT25408A0-FCC-TE	Short
MNEH29-XTC	5.0 GT/s PCIe Gen2		Tall			Tall

1. The NICs have a similar form and fit. The main visible difference is in the bracket height.

1.2 Mellanox Part Numbering Legend

Table 4 describes the Mellanox Technologies adapter cards part numbering legend.

Table 4 - Mellanox Adapter Cards Part Numbering Key

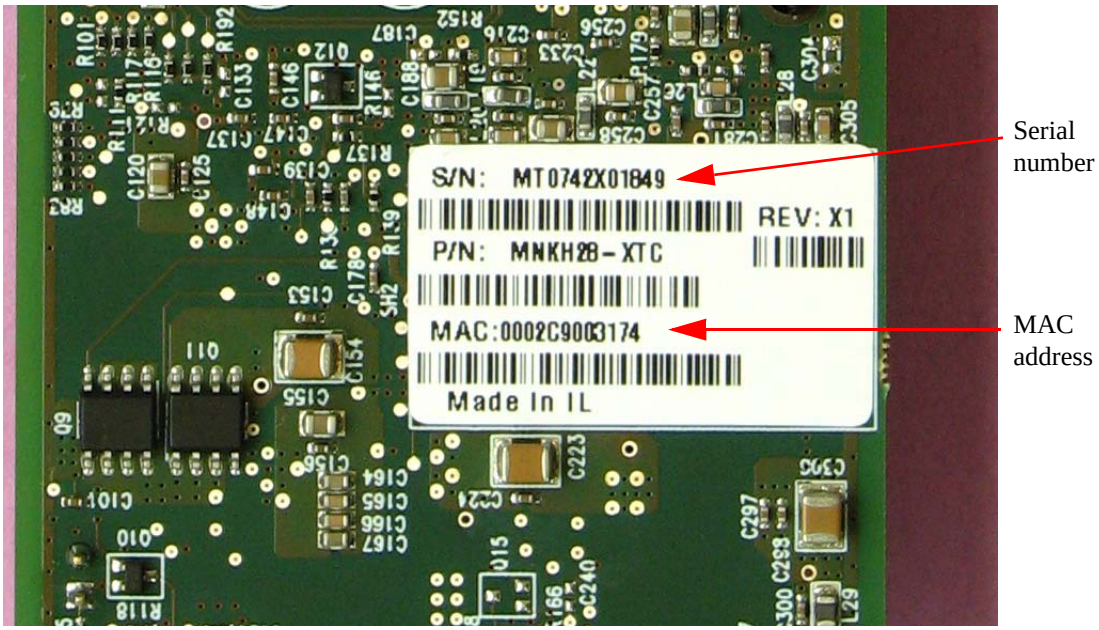
Adapter Card OPN MHTS#I-XBR	Field	Decoder
M	Mellanox Technologies	
H	Adapter Type	H = InfiniBand Host Channel Adapter, N = Ethernet Network Interface Card, S = Express Module
T	Media	E = 10GBASE-CX4*, G = 10GBASE-CX4*, K = 10GBASE-SR (XFP), T = 10GBASE- UTP (Twisted Pair), P = 10GBASE-SR(SFP+) * = with powered connector
S	Silicon	H = ConnectX
#	# ports	1 = 1, 2 = 2,
I	Host Interface	8 = PCIe x8, 9 = PCIe (SerDes @ 5.0 GT/s)
G	Generation	<blank> = Initial product generation B = 2nd Generation board
-	Separator	
X	Memory Size	X = MemFree
B	Bracket	S = Short, T = Tall, N = None
R	RoHS	<blank> = non RoHS, C = RoHS w/ Exemption, R = RoHS Lead-Free

For example, the part number MNEH28-XTC describes Mellanox Technologies' ConnectX EN NIC with dual 10GBASE-CX4 ports, a PCIe2.0 x8 2.5GT/s interface, no on-board memory (mem-free), a tall PCI bracket, and RoHS R5 compliance. Using the legend,

- field M =M to indicate a Mellanox Technologies product,
- field H = N to indicate a Network Interface Card,
- field T =E to indicate 10GBase-CX4 (copper CX4 with media adapter support),
- field S =H to indicate the ConnectX family,
- field # =2 to indicate two ports,
- field I = 8 to indicate PCI Express 2.0 x8 running at 2.5GT/s,
- field X = X to indicate no on-board memory,
- field B = T to indicate a tall bracket, and
- field R = C to indicate RoHS R5 (w/ Exemptions) compliance

1.3 Finding the Mac Address and Serial Number on the Adapter Card

All Mellanox Ethernet NICs have a label on the printed side of the adapter card that has the card serial number and the card MAC address.



2 Adapter Card Installation

2.1 Hardware and Software Requirements

Before installing the NIC, please make sure that the system meets the hardware and software requirements listed in Table 5.

Table 5 - Hardware and Software Requirements

Requirement	Description
Hardware	• Minimum 3 GB of available space • PCI Express x8 or x16 slots
Software Operating Systems/Distributions	• For Windows see WinIB ReadMe at https://docs.mellanox.com/dm/WinIB/ReadMe.html • For Linux see Mellanox OpenFabrics Enterprise Distribution (OFED) software package available via the Mellanox OpenFabrics Web site http://www.mellanox.com/products/ofed.php • Novell SuSE Linux Enterprise server (SLES), Red Hat Enterprise Linux (RHEL), and other Linux distributions • Microsoft Windows Server2003/2008, Windows Compute Cluster Server 2003

2.2 Installation Instructions

2.2.1 Installation Safety Warnings

1. **Installation Instructions**

Read all installation instructions before connecting the equipment to the power source.

2. **Over-temperature**

This equipment should not be operated in an area with an ambient temperature exceeding the maximum recommended:55°C (131°F). Moreover, to guarantee proper air flow, allow at least 8cm (3 inches) of clearance around the ventilation openings.

3. **During Lightning - Electrical Hazard**

During periods of lightning activity, do not work on the equipment or connect or disconnect cables.

4. **Copper InfiniBand Cable Connecting/Disconnecting**

Copper InfiniBand cables are heavy and not flexible, as such they should be carefully attached to or detached from the connectors. Refer to the cable manufacturer for special warnings and instructions.

5. **Equipment Installation**

This equipment should be installed, replaced, or serviced only by trained and qualified personnel.

6. **Equipment Disposal**

Disposal of this equipment should be in accordance to all national laws and regulations.

7. **Local and National Electrical Codes**

This equipment should be installed in compliance with local and national electrical codes.

2.2.2 Installation Instructions

The adapter cards listed in Table 3 on page 8 are standard PCI Express x8 cards each with a standard x8 edge connector. Please consult the host machine documentation for instructions on how to install a PCI Express card.

> Note: When more than one PCI Slot is available first make sure to use the PCI slot with the proper configuration.

Any PCI slot with the proper configuration is acceptable for connection. If the card is installed in a PCI slot with less lanes than the card requires then the adapter card will not provide the optimum data transfer.

3 Driver Software and Firmware

Drivers and Firmware can be downloaded and installed by using the Mellanox OFED download site within the Mellanox Website.

Note: The installation requires administrator privileges on the target machine.

3.1 Driver Software

For Linux, download and install the latest OpenFabrics Enterprise Distribution (OFED) software package available via the Mellanox OpenFabrics Web site at http://www.mellanox.com/products/ofed.php. Follow the installation instructions included in the download package.

For Windows, download the appropriate software from https://docs.mellanox.com/dm/WinIB/ReadMe.html.

3.2 Updating Adapter Card Firmware

Each adapter card is shipped with the latest version of qualified firmware at the time of manufacturing. Firmware is updated occasionally, and the most recent firmware can be obtained from http://www.mellanox.com through the 'Firmware' downloads link.

3.3 Single Adapter Card Firmware Update

Firmware can be updated on the stand-alone single card using the **flint** tool of the *Mellanox Firmware Tools (MFT)* package. This package is available for download, along with its user's manual, from the single adapter card firmware update page. See http://www.mellanox.com under 'Firmware' downloads.

A firmware binaries table lists a binary file per adapter card. The file name of each such binary is composed by combining the firmware name, the firmware release version, and the card part number.

Note: Please contact your assigned Field Application Engineer if you cannot find the firmware binary for your adapter card. This may happen if the product is not yet available for general distribution.

4 Adapter Card Interfaces

4.1 I/O Interfaces

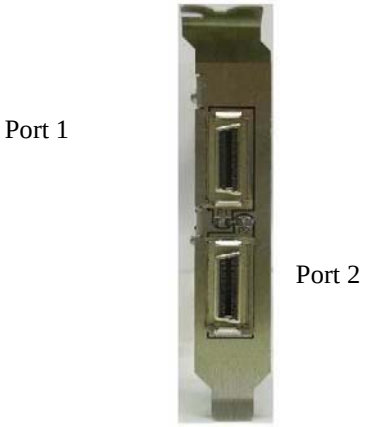
Each adapter card includes the following interfaces:

- Two 4X copper connectors
- PCI Express x8 edge connector
- I/O panel LEDs
- I^2C compatible connector (for debug)

4.1.1 Ethernet CX4 Interface

The ConnectX® EN 10GBase-CX4 device is compliant with the *IEEE Std 802.3ak 10GBASE-CX4*. It has two compliant 4X ports (1 and 2), each having four Tx/Rx pairs of SerDes. Each of the cards (listed in Table 3 on page 8) based on this device provides access to these ports by means of two 4X connectors for external copper cables. Connector 1 connects to port 1 of the device, while connector 2 connects to port 2.

Figure 1: Port Numbering



Each of the NIC cards is embedded with a 'media detect circuit' that supports active cables and external fiber solutions to be connected to the port connectors. Fiber Solutions require the use of active media converters.

4.1.2 PCI Express Interface

The ConnectX®EN 10GBASE-CX4 adapter cards support the PCI Express 2.0 x8 interface, 1.1 compatible. The NICs can be either a master initiating the PCI Express bus operations or a slave responding to PCI bus operations.

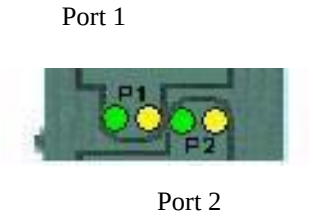
4.1.3 LED Assignment

The board has four LEDs located on the I/O panel - 2 LEDs per port. The green LED, when lit, indicates that the driver is running and a valid physical connection between nodes exists. The green LED, when blinking, indicates that the physical connection between nodes is problematic. The yellow LED when lit, indicates a valid data activity link, this is the logical link. The yellow LED illuminates when the network is discovered over the physical link. A valid

data activity link without data transfer is designated by a constant yellow LED indication. A valid data activity link with data transfer is designated by a blinking yellow LED indication. If the LEDs are not active, either the physical link or the logical link (or both) connections have not been established.

Figure 2: Physical and Logical Link Indications

Port Number	LED Name
Port 1	Physical Link - Green Constant on indicates a good physical link Blinking indicates a problem with the Physical link
	Data Activity - Yellow Blinking indicates Data Transfer Constant on indicates no Data Transfer
Port 2	Physical Link - Green Constant on indicates a good physical link Blinking indicates a problem with the Physical link
	Data Activity - Yellow Blinking indicates Data Transfer Constant on indicates no Data Transfer



Note: The short bracket has the same port and LED footprint as the tall bracket.

4.2 I²C Compatible Interface

A three-pin header on the adapter card is provided as the I²C compatible interface. See Figure 4 on page 22 for the location on the board.

Figure 3: I²C Connector

4.3 Power

All adapter cards receive power from the PCI Express Edge connector. All other required power voltages are generated by on-board switch mode regulators. For power consumption see Specifications starting on page 22.

4.4 Memory

The NICs support multiple memory devices through the PCI Express, Flash, and I2C-compatible interfaces.

4.4.1 System Memory

Each of the NICs utilize the PCI Express interface to store and access connection information and packet data on the system memory.

4.4.2 Flash

Each of the NICs includes one 2MB SPI Flash device (P/N M25P16-VME6G by ST Microelectronics) accessible via the Flash interface of the MT25408 ConnectX EN device.

There is a jumper on each adapter card that indicates to the device whether an on-board Flash device exists (or is to be used). Table 6 provides information on this jumper. See Figure 4 on page 22 for the jumper location.

Table 6 - Jumper Configuration

Description	Option	Card Default Configuration	Comments
Flash present/ not present	connection open – Flash present connection shorted – Flash not present 	connection open – Flash present	Header 1x2

4.4.3 EEPROM

Each board incorporates an EEPROM that is accessible through the I2C-compatible interface. The EEPROM is used for storing the Vital Product Data (VPD). The VPD format adheres to the *PCI Local Bus specification rev 2.3* VPD definition (see "VPDs" on page 18). The EEPROM capacity is 512 bytes.

4.5 VPDs

- The PCI VPD (Vital Product Data) layout for each of the described Mellanox Technologies ConnectX® EN 10GBASE-CX4 NICs cards comply with the format defined in the *PCI 2.3.*

Table 7 - VPD Layout for MNEH28-XTC

Offset (Decimal)	Item	Value	Format	Description
0	Large Resource Type ID String Tag (0x02)	0x82		
1	Length [7:0] LSB	0xD		
2	Length [15:8] MSB	0x0		
3	Data	Eagle 10G-ETH	STR	
16	Large Resource Type VPD-R Tag (0x10)	0x90		
17	Length [7:0] LSB	0x4F		
18	Length [15:8] MSB	0x00		
19	VPD Keyword	PN	STR	Add in Card Part Number
21	Length	0x15		
22	PN	MNEH28-XTC	%STR_SPC	
43	VPD Keyword	EC	STR	Engineering Change Level of the card (rev)
45	Length	0x2		
46	Revision	A1	%STR	PCB revision
48	VPD Keyword	SN	STR	Serial Number
50	Length	0x18		
51	Serial Number		%STR_SPC	“00..00XXXX..XX”
75	VPD Keyword	V0	STR	Misc. Information
77	Length	0x10		
78	Data	PCIe x8	STR_SPC	
94	VPD Keyword	RV	STR	
96	Length	0x1		
97	Data	0,96	%CS0	
98	Large Resource Type VPD-W Tag (0x11)	0x91		
99	Length [7:0] LSB	0x9A		
100	Length [15:8] MSB	0x00		
101	VPD Keyword	V1	STR	EFI Driver version
103	Length	0x6		
104	Data	N/A	STR_SPC	
110	VPD Keyword	YA	STR	Asset Tag
112	Length	0x20		
113	Data	N/A	STR_SPC	“N/A”
145	VPD Keyword	RW	STR	Remaining read/write area
147	Length	0x6B		
148	Data		STR_ZERO	Reserved (0x00)
255	Small Resource Type END Tag (0x11)	0x78		

Table 8 - VPD Layout for MNEH28-XSC

Offset (Decimal)	Item	Value	Format	Description
0	Large Resource Type ID String Tag (0x02)	0x82		
1	Length [7:0] LSB	0xD		
2	Length [15:8] MSB	0x0		
3	Data	Eagle 10G-ETH	STR	
16	Large Resource Type VPD-R Tag (0x10)	0x90		
17	Length [7:0] LSB	0x4F		
18	Length [15:8] MSB	0x00		
19	VPD Keyword	PN	STR	Add in Card Part Number
21	Length	0x15		
22	PN	MNEH28-XSC	%STR_SPC	
43	VPD Keyword	EC	STR	Engineering Change Level of the card (rev)
45	Length	0x2		
46	Revision	A1	%STR	PCB revision
48	VPD Keyword	SN	STR	Serial Number
50	Length	0x18		
51	Serial Number		%STR_SPC	"00..00XXXX..XX"
75	VPD Keyword	V0	STR	Misc. Information
77	Length	0x10		
78	Data	PCIe x8	STR_SPC	
94	VPD Keyword	RV	STR	
96	Length	0x1		
97	Data	0,96	%CS0	
98	Large Resource Type VPD-W Tag (0x11)	0x91		
99	Length [7:0] LSB	0x9E		
100	Length [15:8] MSB	0x00		
101	VPD Keyword	V1	STR	EFI Driver version
103	Length	0x6		
104	Data	N/A	STR_SPC	
110	VPD Keyword	YA	STR	Asset Tag
112	Length	0x20		
113	Data	N/A	STR_SPC	"N/A"
145	VPD Keyword	RW	STR	Remaining read/write area
147	Length	0x6F		
148	Data		STR_ZERO	Reserved (0x00)
259	Small Resource Type END Tag (0x11)	0x78		

Table 9 - VPD Layout for MNEH29-XTC

Offset (Decimal)	Item	Value	Format	Description
0	Large Resource Type ID String Tag (0x02)	0x82		

Table 9 - VPD Layout for MNEH29-XTC (Continued)

Offset (Decimal)	Item	Value	Format	Description
1	Length [7:0] LSB	0xD		
2	Length [15:8] MSB	0x0		
3	Data	Eagle 10G-ETH	STR	
16	Large Resource Type VPD-R Tag (0x10)	0x90		
17	Length [7:0] LSB	0x4F		
18	Length [15:8] MSB	0x00		
19	VPD Keyword	PN	STR	Add in Card Part Number
21	Length	0x15		
22	PN	PN	%STR_SPC	
43	VPD Keyword	EC	STR	Engineering Change Level of the card (rev)
45	Length	0x2		
46	Revision	X1	%STR	PCB revision
48	VPD Keyword	SN	STR	Serial Number
50	Length	0x18		
51	Serial Number		%STR_SPC	“00..00XXXX..XX”
75	VPD Keyword	V0	STR	Misc. Information
77	Length	0x10		
78	Data	PCIe Gen2 x8	STR_SPC	
94	VPD Keyword	RV	STR	
96	Length	0x1		
97	Data	0,96	%CS0	
98	Large Resource Type VPD-W Tag (0x11)	0x91		
99	Length [7:0] LSB	0x9A		
100	Length [15:8] MSB	0x00		
101	VPD Keyword	V1	STR	EFI Driver version
103	Length	0x6		
104	Data	N/A	STR_SPC	
110	VPD Keyword	YA	STR	Asset Tag
112	Length	0x20		
113	Data	N/A	STR_SPC	“N/A”
145	VPD Keyword	RW	STR	Remaining read/write area
147	Length	0x6B		
148	Data		STR_ZERO	Reserved (0x00)
255	Small Resource Type END Tag (0x11)	0x78		

Table 10 - VPD Layout for MNEH29-XSC

Offset (Decimal)	Item	Value	Format	Description
0	Large Resource Type ID String Tag (0x02)	0x82		
1	Length [7:0] LSB	0xD		
2	Length [15:8] MSB	0x0		
3	Data	Eagle 10G-ETH	STR	
16	Large Resource Type VPD-R Tag (0x10)	0x90		
17	Length [7:0] LSB	0x4F		
18	Length [15:8] MSB	0x00		
19	VPD Keyword	PN	STR	Add in Card Part Number
21	Length	0x15		
22	PN	PN	%STR_SPC	
43	VPD Keyword	EC	STR	Engineering Change Level of the card (rev)
45	Length	0x2		
46	Revision	X1	%STR	PCB revision
48	VPD Keyword	SN	STR	Serial Number
50	Length	0x18		
51	Serial Number		%STR_SPC	"00..00XXXX..XX"
75	VPD Keyword	V0	STR	Misc. Information
77	Length	0x10		
78	Data	PCIe Gen2 x8	STR_SPC	
94	VPD Keyword	RV	STR	
96	Length	0x1		
97	Data	0,96	%CS0	
98	Large Resource Type VPD-W Tag (0x11)	0x91		
99	Length [7:0] LSB	0x9A		
100	Length [15:8] MSB	0x00		
101	VPD Keyword	V1	STR	EFI Driver version
103	Length	0x6		
104	Data	N/A	STR_SPC	
110	VPD Keyword	YA	STR	Asset Tag
112	Length	0x20		
113	Data	N/A	STR_SPC	"N/A"
145	VPD Keyword	RW	STR	Remaining read/write area
147	Length	0x6B		
148	Data		STR_ZERO	Reserved (0x00)
255	Small Resource Type END Tag (0x11)	0x78		

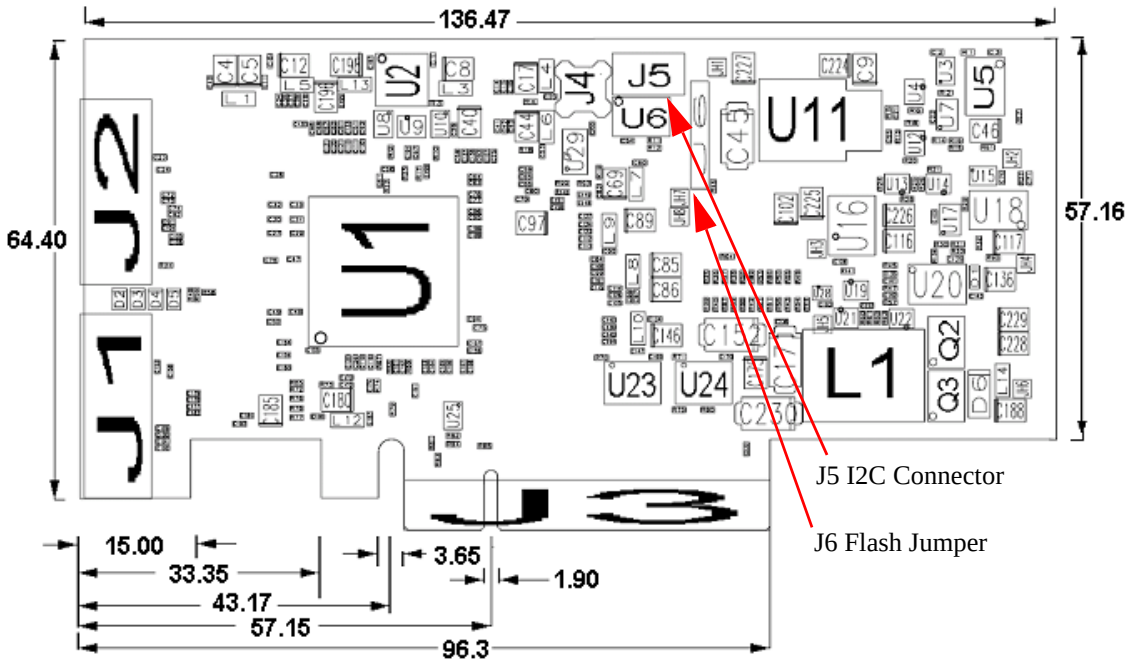
Appendix A: Specifications

A.1 Board Mechanical Drawing and Dimensions

All the NICs covered in this *User's Manual* have the same mechanical drawing and share the same dimensions as depicted in Figure 4.

Note: All dimensions are in millimeters.

Figure 4: Schematic of the Ethernet Adapter Card With CX4 Connectors



A.2 EMC Certification Statements

Table 11 lists the approved EMC certification status per adapter card in different regions of the world.

Table 11 - Adapter Cards EMC certification Status

Adapter Card P/N	FCC Class (USA)	EN Class (Europe)	ICES Class (Canada)	VCCI (Japan)	C-Tick (Australia and New Zealand)	MIC /BCC (Korea)	IEC/EN	cTUVus	CB
MNEH28-XSC,	A	A	A	A		✓	✓	✓	✓

Table 11 - Adapter Cards EMC certification Status

Adapter Card P/N	FCC Class (USA)	EN Class (Europe)	ICES Class (Canada)	VCCI (Japan)	C-Tick (Australia and New Zealand)	MIC /BCC (Korea)	IEC/EN	cTUVus	CB
MNEH28-XTC,	A	A	A	A	✓	✓	✓	✓	✓
MNEH29-XSC,	A	A	A	A			✓	✓	✓
MNEH29-XTC	A	A	A	A		✓	✓	✓	✓

A.2.1 FCC

A.2.2 Statements (USA)

Class A Statements:

§ 15.21

Statement

Warning! Changes or modifications to this equipment not expressly approved by the party responsible for compliance (Mellanox Technologies) could void the user's authority to operate the equipment.

§15.105(a)

Statement

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

A.2.3 EN Statements (Europe)

EN55022 Class A Statement: RF Emissions Control

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

A.2.4 ICES Statements (Canada)

Class A Statement:

“This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.”

A.2.5 VCCI Statements (Japan)

Class A Statement:

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

A.2.6 (Translation - "This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.")

A.2.7 MIC Statement (Republic of Korea)

Korea's "Regulation for Certification of Information and Communication Equipment," requires EMC testing and certification for many electronic products. Korean EMC certifications are issued by Radio Research Laboratory (RRL), which is organized under the Ministry of Information and Communications (MIC). EMC testing includes electromagnetic emissions (EMI) and susceptibility (EMS). Certified equipment is labeled with the MIC mark and certification number.

Class A Statement:

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며 만약 잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Translation:

Class A Device: This device is registered for EMC requirements for industrial use. The seller or buyer should be aware of this. If this type was sold or purchased by mistake, it should be replaced with a residential-use type.

A.3 MNEH28-[XTC, XSC] Specifications

Table 12 - Specifications for MNEH28-[XTC XSC]

Physical		**Power and Environmental**	
Size:	2.54in. x 5.37in. (64.4mm x 136.47mm)	Voltage:	12V, 3.3V
Air Flow:		Typ. Power	TBD
4X 20Gb/s Connector:	200LFM @55°C InfiniBand (Copper, current rating: 0.5A max) with active media adapter support	single port operation:	TBD
		dual port operation:	9.63W
		Maximum Power	TBD
		single port operation:	TBD
		dual port operation:	10.89W
		Temperature:	0°C to 55°C
Protocol Support		**Regulatory**	
Ethernet:	IEEE Std 802.3ae 10 Gigabit Ethernet IEEE Std 802.3ak 10GBASE CX4 IEEE Std 802.3aq 10GBASE LRM Multicast and Jumbo Frame Support	EMC:	 TBD TBD TBD MIC/BCC Cert
QoS:	8 Virtual Lanes for each port		
DMA Support:	Yes, All Ports		RoHS COC
Double Data Rate:			
PCI Express	2.0 SERDES @ 2.5 GT/s		
		Safety:	

A.4 MNEH29-[XTC, XSC] Specifications

.

Table 13 - Specifications for MNEH29-[XTC XSC]

Physical		**Power and Environmental**	
Size:	2.54in. x 5.37in. (64.4mm x 136.47mm)	Voltage:	12V, 3.3V
Air Flow:	200LFM @55°C	Typ. Power	TBD
4X 20Gb/s Connector:	InfiniBand (Copper, current rating: 0.5A max) with active media adapter support	single port operation:	11.73W
		dual port operation:	TBD
		Maximum Power	TBD
		single port operation:	13.34W
		dual port operation:	0°C to 55°C
		Temperature:	
Protocol Support		**Regulatory**	
Ethernet:	IEEE Std 802.3ae 10 Gigabit Ethernet IEEE Std 802.3ak 10GBASE CX4 IEEE Std 802.3aq 10GBASE LRM Multicast and Jumbo Frame Support	EMC:	 TBD MIC/BCC Cert (MNEH29-XTC only) TBD
QoS:	8 Virtual Lanes for each port		
DMA Support:	Yes, All Ports		RoHS COC
Double Data Rate:			
PCI Express	2.0 SERDES @ 5.0 GT/s		
		Safety:	
		Environmental:	
		RoHS:	

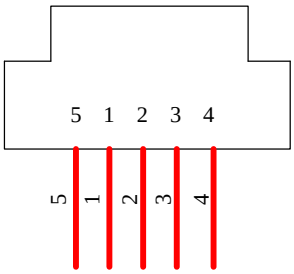
Appendix B: Interface Connectors Pinout

B.1 I²C-compatible Connector Pinout

Figure 5: I2C-Compatible Connector

Table 14 - I2C-Compatible Connector Pinout

Connector Pin Number	Adapter Card Signal Name
1	SPSDA
2	SPSCL
3	GND
4	NC
5	NC



B.2 Ethernet Connector Pinout

Figure 6: ConnectX CX4 Copper Connector Pinout

Table 15 - Connector Pin To Port Signal Name

Connector Pin Number	Connector Pin Name	IB Port A Signal Name	IB Port B Signal Name
S1	IBtxIp(0)	Rx_A1	Rx_B1
S2	IBtxIn(0)	Rx_A0	Rx_B0
S3	IBtxIp(1)	Rx_A3	Rx_B3
S4	IBtxIn(1)	Rx_A2	Rx_B2
S5	IBtxIp(2)	Rx_A5	Rx_B5
S6	IBtxIn(2)	Rx_A4	Rx_B4
S7	IBtxIp(3)	Rx_A7	Rx_B7
S8	IBtxIn(3)	Rx_A6	Rx_B6
S9	IBtxOn(3)	Tx_A6	Tx_B6
S10	IBtxOp(3)	Tx_A7	Tx_B7
S11	IBtxOn(2)	Tx_A4	Tx_B4
S12	IBtxOp(2)	Tx_A5	Tx_B5
S13	IBtxOn(1)	Tx_A2	Tx_B2
S14	IBtxOp(1)	Tx_A3	Tx_B3
S15	IBtxOn(0)	Tx_A0	Tx_B0
S16	IBtxOp(0)	Tx_A1	Tx_B1
G1-G6, G9, H1-H2	Signal Ground	GND	GND
G7[1]	Sense-3.3V	SENSE_P1	SENSE_P2
G8	Vcc	MC_POWER_P1	MC_POWER_P2

1. The Sense-3.3V signal is used to enable the Vcc power supply pin (G8) used to provide power to the active media adapter.

B.3 PCI Express x8 Connector Pinout

These cards use a standard PCI Express x8 edge connector and the PCI Express x8 standard pinout according to the PCI Express 2.0 specification.

Appendix C: Replacing Existing Bracket on Adapter Cards

Adapter cards come in two bracket heights. If your adapter card has a bracket that is not compatible with your platform, this appendix provides instructions on how to remove a bracket from a standard Mellanox Technologies adapter card and replace it with a different one. It includes the following sections:

- "Removing Bracket"
- "Placing a Kapton® Polyimide Label""Assembling a New Bracket"

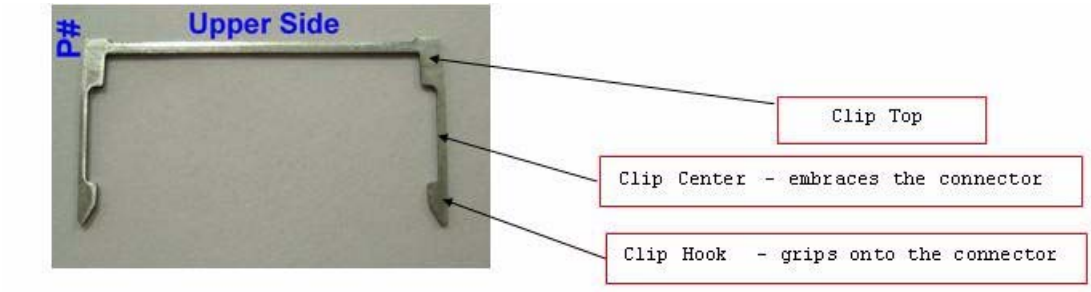
Figure 7 shows the bracket-side view of a dual-port Adapter card.

Figure 7: Tall Bracket of a Dual IB Port Adapter Card

C.1 Removing Bracket

Figure 8 shows a connector retention clip and the designated names of its sections.

Figure 8: Connector Retention Clip



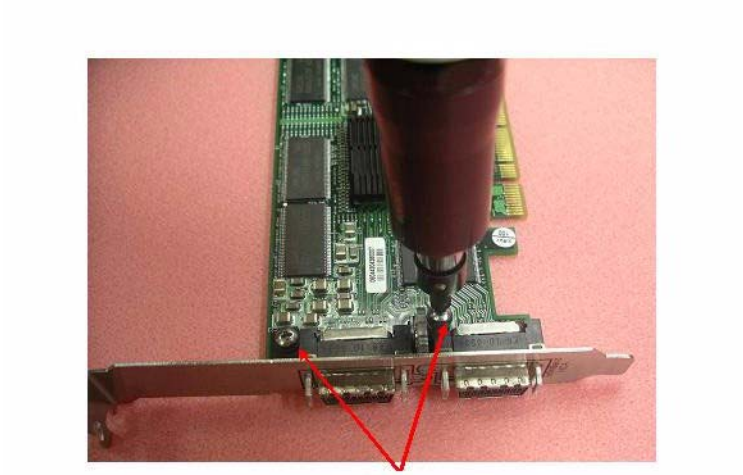
1. Using a small flat head screwdriver, gently push up one hook of a connector's clip toward the connector's top side as shown in Figure 9 (a) on page 30.
2. Then push the other hook each of the two clip's hook towards the connector's top side - see Figure 9 (b). Finally, pull the clip away from its center - see Figure 9 (c).

Figure 9: Extracting Connector Clip

(a) Gently Push One Hook of Clip (b) Gently Push Other Hook of Clip (c) Pull Clip Away

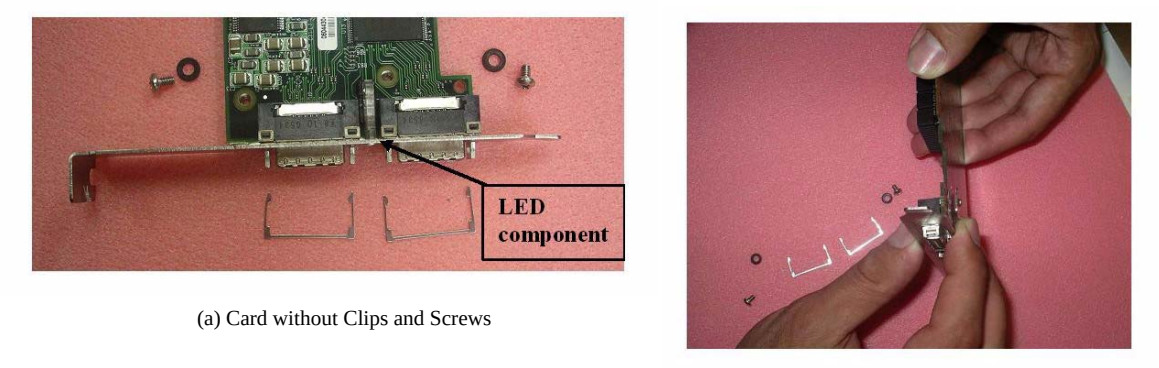
3. Repeat the above actions for the second connector's clip.
4. Unscrew both screws from the card using a torque screwdriver as shown in Figure 10.

Figure 10: Unscrew Bracket Screws



5. Grip the bracket as shown in Figure 11, placing your thumb on the LED component.
6. In a rotating move toward the component side of the card, slide the bracket out of the connectors (Figure 11 (c)).
7. Gently hold your thumb on the LED component.
8. At the same time extract the bracket as shown in Figure 11 c, (Make sure to protect the LED while extracting the bracket).

Figure 11: Rotate the Bracket to Detach it From the Card



(a) Card without Clips and Screws

(b) Grip the Card in preparation for Detachment

(c) Rotate the bracket toward the Component Side.

C.2 Placing a Kapton® Polyimide Label

Prior to assembling the bracket, you need to apply a Kapton® polyimide round label on the board's Print Side.

Note: Check to see if the label is already installed as this label may have been installed at the factory.

Note: The label can be provided by Mellanox Technologies (P/N: MEC000821).

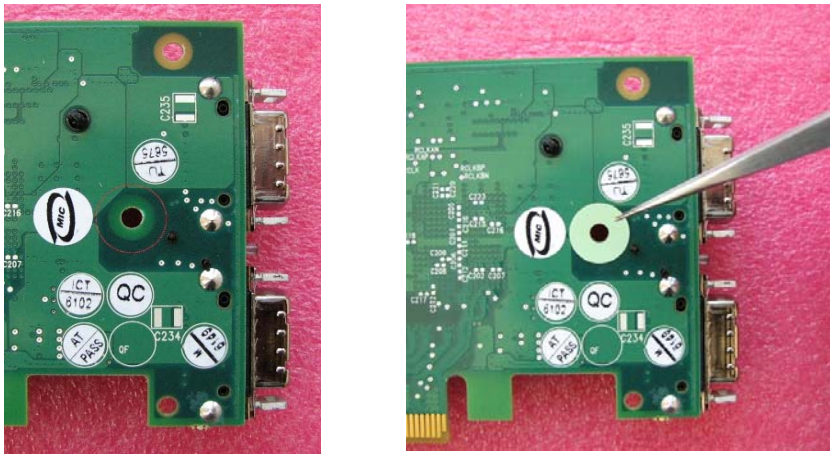
The following steps are instructions for placing the polyimide label:

1. Make sure your working area is ESD protected.
2. Hold the label with light pincers. See Figure 12.

Figure 12: Hold Kapton Label With Pincers

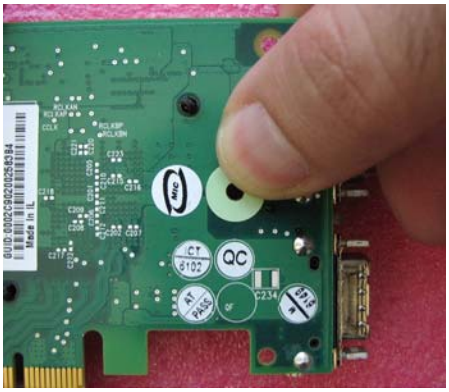
3. Gently place the label as shown in Figure 13. Make sure to align the center hole of the label with the drilled hole in the board.

Figure 13: Place Label on Print Side With Label's and Card's Holes Aligned



4. After placing the label, complete the process by (gently) sweeping your thumb on the label to assure the label is well-attached onto board. See Figure 14.

Figure 14: Ensure That Label is Well-attached



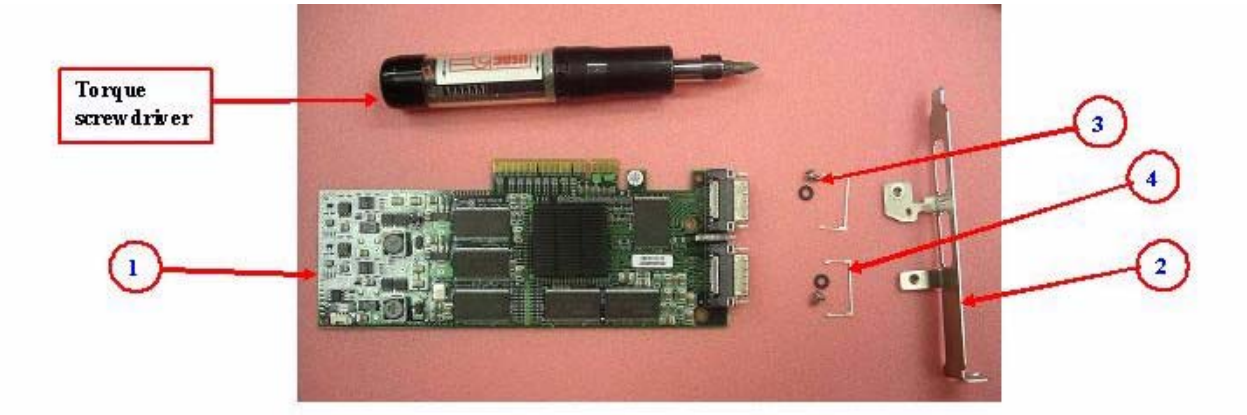
See also Figure 22, "Print Side View After Bracket Assembly With Kapton Label," on page 36.

Now your card is ready for a new bracket assembly.

C.3 Assembling a New Bracket

The bracket can now be assembled onto the Adapter card. See Figure 15.

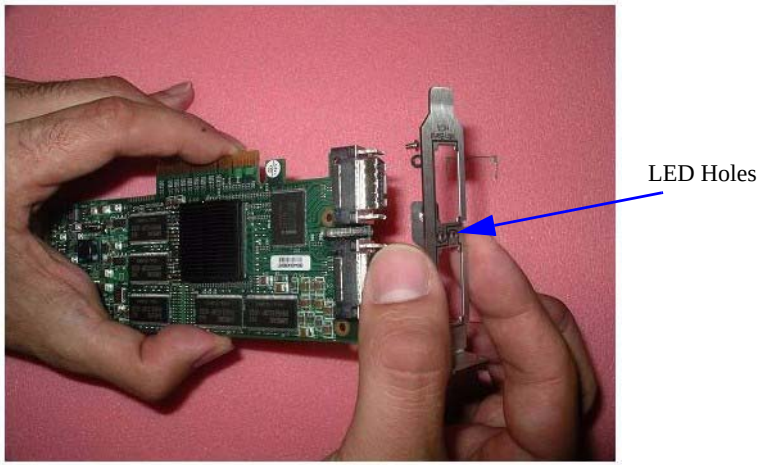
Figure 15: Adapter Card Ready for New Bracket



Gently place the bracket onto the card fitting the connectors through the bracket connector holes. Make sure the LEDs are aligned into their intended bracket holes.

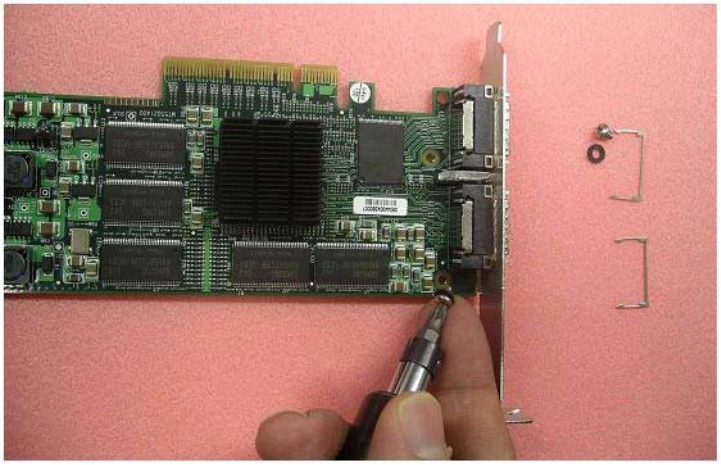
Insert a screw along with a washer into each of the two holes on the card intended for holding the bracket.

Figure 16: Place Bracket onto Card



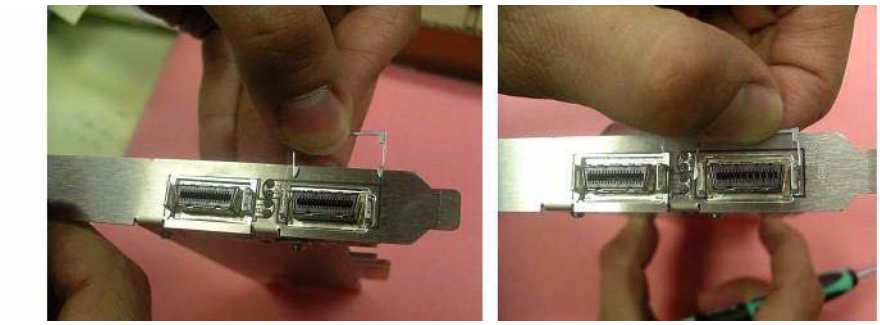
5. Use a torque screwdriver to apply up to 2 lbs-in torque on each screw.

Figure 17: Attach Bracket onto Card using Screws



6. Gently push one clip onto the connector. Make sure to slide both clip hooks (sides) around the connector evenly as shown in Figure 18.

Figure 18: Sliding Connector Clip Evenly



7. Use a small flat head screwdriver to gently slide the clip's hook towards the connector's base side as shown in Figure 20.

Figure 19: Fix Clip Hooks into Place Using Screwdriver

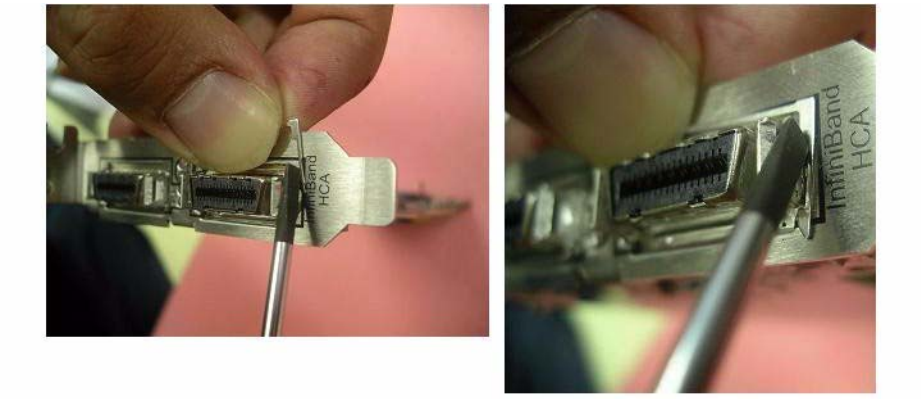
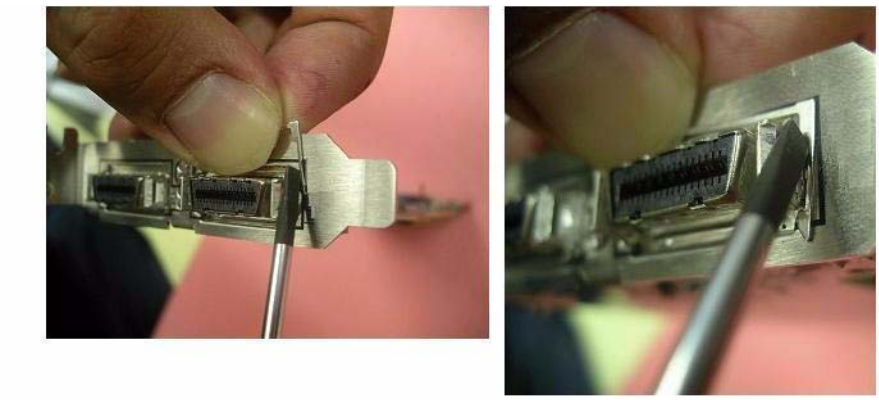


Figure 20: Spread the Hooks to Slide on the Clip



8. Repeat this step for the second clip. See Figure 21 for the assembled new bracket (side) view, and Figure 22 for the Print Side view showing the Kapton label

Figure 21: Assembled Bracket View

- the new bracket of the proper height

Figure 22: Print Side View After Bracket Assembly With Kapton Label

Appendix D: Avertissements de sécurité d'installation

1. **Instructions d'installation**

Lisez toutes les instructions d'installation avant de brancher le matériel à la source d'alimentation électrique.

2. **Température excessive**

Ce matériel ne doit pas fonctionner dans une zone avec une température ambiante dépassant le maximum recommandé de 55°C (131°F). En outre, pour garantir un bon écoulement de l'air, laissez au moins 8 cm (3 pouces) d'espace libre autour des ouvertures de ventilation.

3. **Orages – dangers électriques**

Pendant un orage, il ne faut pas utiliser le matériel et il ne faut pas brancher ou débrancher les câbles.

4. **Branchement/débranchement des câbles InfiniBand en cuivre**

Les câbles InfiniBand en cuivre sont lourds et ne sont pas flexibles, il faut donc faire très attention en les branchant et en les débranchant des connecteurs. Consultez le fabricant des câbles pour connaître les mises en garde et les instructions spéciales.

5. **Installation du matériel**

Ce matériel ne doit être installé, remplacé ou entretenu que par du personnel formé et qualifié.

6. **.Elimination du matériel**

L'élimination de ce matériel doit s'effectuer dans le respect de toutes les législations et réglementations nationales en vigueur.

7. .Codes électriques locaux et nationaux

Ce matériel doit être installé dans le respect des codes électriques locaux et nationaux.